

## CLAIMS

What is claimed is:

1. A start-up automatic frequency control (AFC) method used during initial cell search (ICS) processing by a user equipment (UE) receiver, where the ICS comprises Step 1 processing of a given sequence, the method comprising:

- a) receiving said sequence;
- b) rotating a phase of the sequence;
- c) correlating a primary synchronization channel (PSCH) sequence with the rotated phase of the received sequence and an unrotated phase of the received sequence; and

- d) integrating the two correlations of step (c),

whereby the AFC start-up method is performed in parallel with the Step 1 sequence processing.

2. The method of Claim 8 wherein the given sequence is a primary synchronization code (PSC) sequence.

3. The method of Claim 1 further comprising repeating steps (b) to (d) a given number of times.

4. The method of Claim 3 wherein steps (b) to (d) are preferably repeated twenty-four (24) times.

5. A system for performing start-up AGC during initial cell search (ICS) by a user equipment (UE) receiver, where the ICS comprises Step 1 processing of a given sequence, comprising:

- a first correlator for receiving a first stored sequence of the primary synchronization channel;

a second correlator for receiving a second stored sequence of the primary synchronization channel;

an error estimator for determining the error associated with the outputs of the first and second correlators;

a filter for selectively integrating the error estimate responsive to an initial or steady state conditions of the cell search process; and

one of a voltage controlled oscillator (VCO) and numeric controlled oscillator (NCO) for adjusting frequency responsive to the integrated error estimate.

6. The system of Claim 5 wherein the given sequence is a primary synchronization code (PSC) sequence.

7. The system of Claim 5 wherein the filter is a PI filter.

8. The system of Claim 5 wherein said filter is a digital filter having a delay element of  $1/(1-z^{-1})$ .

9. The method of claim 1 wherein:

a received input power level is adjusted prior to steps (a) to (d).

10. The method of claim 9 wherein the input is digitized after adjustment of the power level.

11. The method of claim 9 wherein the power level is set employing open loop gain control.

12. The method of claim 1 wherein the step of ICS processing includes: obtaining the primary synchronization code (PSC).

13. The method of claim 12 further comprising:  
employing the PSC to extract the secondary synchronization code (SSC) from the received input.
14. The method of claim 13 wherein the received PSC and SSC are utilized to extract a midamble portion from the received input.
15. The method of claim 14 wherein a midamble having a highest energy is selected from the extracted midamble portion.
16. The method of claim 1 wherein a periodic cell search is conducted to obtain a best base station during a given period.
17. The method of claim 1 wherein the frequency adjustment is numerically controlled.
18. The method of claim 1 wherein the frequency adjustment is voltage controlled.
19. The method of claim 1 wherein the Step 1 processing is repeated every  $N_1$  frames where  $N$  is a real integer and  $N \geq 1$ .
20. A method for adjusting frequency during an initial cell search in a wireless network, comprising:
  - a) obtaining a synchronization code responsive to a received input containing a sequence;
  - b) rotating a phase of the sequence;

c) correlating a primary synchronization channel (PSCH) sequence with the rotated phase of the received sequence and an unrotated phase of the received sequence; and

d) integrating the two correlations of step (c),

whereby the AFC start-up method is performed in parallel with step (a).